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STUDIES IN COLORADO FUNGI—I. DISCOMYCETES

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The present report is based on a collection of fungi made by the writer and Professor Elsworth Bethel, during a part of last August and September, in the Rocky Mountains in the vicinity of Denver. The most of the collections were made about Tolland, on the Moffat Road, at an elevation of 9,000 to 10,000 feet, at Golden, in the foothills, at an elevation of 6,000 feet, and in Geneva Creek Canyon, at elevations of 8,000 to nearly 14,000 feet.

Of a collection of 900 specimens, about 250 were included in the discomycetes. A critical study of these has revealed a number of points of interest, and, for this reason, a list of the species determined is reported in the following paper, with comments on those which are of especial interest. A number of species collected I have been unable to determine, and these are held for more critical study. Specimens of the species reported here are deposited in the herbarium of the Garden.

GEOGLOSSACEAE

MITRULA GRACILIS Karst. Hedwigia 22: 17. 1883

Dr. E. J. Durand in his recent monograph of the North American Geoglossaceae (Ann. Myc. 6: 26. 1908) records this species from Labrador and Newfoundland; he also states that the species has been reported from Greenland. Our Colorado specimens agree well in spore characters and habitat with the description given by Dr. Durand. The plants occur attached to and apparently parasitic on some species of bog moss in one of the gulches of Geneva Creek Canyon, where they were collected in quantity. *Mitrula musicola* P. Henn., which has been reported from Alberta, is said to differ only in the larger size and more convolute hymenium. More than a hundred plants were collected in Colorado and on the same host the fungus was found to vary much in size; young plants were found with a stem not over 2 mm. long

and a pileus 1 mm. in diameter, while in older plants the stem was often 2 cm. long and the pileus as large as 4 mm. in diameter, the convolutions being more marked in old than in young plants. To me it would seem doubtful if these two species can be separated on these characters. A single specimen of *Mitrula musicola* was found in the Garden collection.

MITRULA IRREGULARIS (Peck) Durand, Ann. Myc. 6: 398. 1908

Several specimens of this species were collected at Tolland, where the plants occur on bare ground or among moss in coniferous woods. The species has formerly been reported from Ontario and New Brunswick south to the District of Columbia.

HELVELLACEAE

HELVELLA ELASTICA Bull. Hist. Champ. Fr. 299. 1791

Two plants collected among moss in Geneva Creek Canyon.

RHIZINACEAE

PSILOPEZIA BABINGTONI Berk. Outl. Brit. Fungol. 373. 1860

On rotten wood in Geneva Creek Canyon.

PEZIZACEAE

BARLAEA CONSTELLATIO (Berk. & Br.) Sacc. Syll. Fung. 8: 111.
1889

This species was found to be very common on damp soil, both at Tolland and in Geneva Creek Canyon. The plants are bright-red and the spores smooth, with one large oil-drop often surrounded by numerous smaller ones.

BARLAEA CREC'HQUERAULTII (Crouan) Sacc. Syll. Fung.

8: 113. 1889

Ascobolus Crec'hqueraultii Crouan, Ann. Sci. Nat. IV. 10: 194.
1858.

Peziza modesta Karst. Myc. Fenn. 1: 64. 1871.

Crouania asperella Rehm, Hedwigia 24: 226. 1885.

This species was collected in Pennsylvania in 1881 and distributed by Mr. Ellis in North American Fungi 841 under the name of *Peziza modesta* Karst., which species is undoubtedly a synonym of the above. The species has also been collected and reported by the writer from Iowa. Several collections of this species

were made in Colorado, at Tolland and in Geneva Creek Canyon. The plants collected in Colorado are as large as 5 mm. in diameter, a little larger than the Iowa specimens, but spore characters are identical. Cotype material of *Crouania asperella* Rehm has been examined and found to be the same. While the species has been commonly collected and distributed in European exsiccati, the only American specimens seen, with the exception of our own collections, were those distributed by Mr. Ellis in his exsiccati. *Peziza modesta* Karst. has also been reported from Minnesota by Miss D. Hone. For diagnostic characters and illustration, see Iowa Discomycetes.

DETONIA TRACHYCARPA (Curr.) Sacc. Syll. Fung. 8: 105. 1889

This specimen was mailed to me after returning from Colorado, having been collected by Professor E. Bethel at Lake Eldora, Sept. 17, 1910.

HUMARIA ORTHOTRICHIA (Cooke & Ellis) Sacc. Syll. Fung. 8: 119.
1889

On the ground among moss, Geneva Creek Canyon.

HUMARIA RUBENS Boud. Bull. Soc. Myc. Fr. 12: 13. 1896

One collection in Geneva Creek Canyon.

LACHNEA MINIATA Funckel, Symb. Myc. app. 3: 32. 1875

The species is characterized by its reticulate spores. Two collections were made in Geneva Creek Canyon.

LACHNEA SETOSA (Nees) Gill. Discom. 75. 1879

One collection on wood at Golden.

LACHNEA UMBRORUM (Fries) Sacc. Syll. Fung. 8: 174. 1889

Abundant on soil at Tolland and in Geneva Creek Canyon. Similar in general appearance to *L. scutellata* but spores very rough, verrucose.

OTIDEA LEPORINA (Batsch) Fuckel, Symb. Myc. 229. 1869

One collection at Tolland.

PEZIZA CUPULARIS L. Sp. Pl. ed. 2. 1651. 1763

Common on the ground in coniferous woods at Tolland and in Geneva Creek Canyon.

PEZIZA BADIA Pers. Obs. Myc. 2: 78. 1799

On soil and rotten wood in Geneva Creek Canyon.

PEZIZA BRUNNEO-ATRA Desm. Ann. Sci. Nat. II. 6: 244. 1836

On soil in Geneva Creek Canyon.

SARCOSPHAERA ARENOSA (Fuckel) Lindau in E. & P. Nat. Pfl. 1¹:
182. 1897

Two collections on sandy soil in Geneva Creek Canyon.

SPHAEROSPORA TRECHISPORA (Berk. & Br.) Sacc. Michelia 1: 594.
1879

On soil in Geneva Creek Canyon. The spores in this species are figured by Massee as being reticulate. I can find no reticulations although the spores are coarsely verrucose. Our specimens conform well with European specimens studied but the spores are slightly larger, reaching a maximum size of 26μ in diameter, being much smaller, however, before reaching maturity. No other American specimens have been seen.

ASCOBOLACEAE

ASCOPHANUS CARNEUS (Pers.) Boud. Ann. Sci. Nat. V. 10: 250.
1869

Cultivated on horse dung from Tolland.

ASCOPHANUS ARGENTEUS (Curr.) Boud. Ann. Sci. Nat. V. 10:
245. 1869

Cultivated on cow dung from Geneva Creek Canyon.

ASCOPHANUS CINEREUS (Crouan) Boud. Ann. Sci. Nat. V. 10:
249. 1869

Cultivated on horse dung from Tolland.

ASCOPHANUS MICROSPORUS (Berk. & Br.) Phill. Brit. Discom.
307. 1887

Cultivated on rabbit dung from Geneva Creek Canyon.

ASCOBOLUS IMMERSUS Pers. Obs. Myc. 1: 35. 1796

Cultivated on cow dung from Geneva Creek Canyon and horse dung from Tolland.

ASCOBOLUS STERCORARIUS (Bull.) Schröter in E. & P. Nat. Pfl.
1: 198. 1897

Cultivated on cow dung from Geneva Creek Canyon and Tolland.

***Ascobolus xylophilus* sp. nov.**

Plants gregarious, sessile, 1–2 mm. in diameter, dark-colored, blackish to the naked eye, reddish-brown with the lens; hymenium slightly concave or nearly plane; asci large, cylindric or clavate, $175\text{--}235 \times 30\text{--}35 \mu$, operculate, 8-spored; spores 1-seriate or partially 2-seriate above, large, ellipsoid, with ends narrowed, purple, at first smooth, becoming slightly roughened, $35\text{--}38 \times 13\text{--}15 \mu$.

On the weathered surface of some coniferous wood, Geneva Creek Canyon, September, 1910.

Two species of *Ascobolus* are reported by Saccardo on pine wood: *Ascobolus lignatilis* Albert. & Schw. and *Ascobolus denudatus* Fries. Our species is very different from either, both in gross and spore characters. This is, so far as we can find, the only North American species of the genus reported on wood, most of the species occurring on the dung of animals.

LASIOBOLUS EQUINUS (Müll.) Karst. Act. Soc. Faun. Fl. Fenn.
2: 122. 1885

On cow dung and horse dung from Tolland.

RYPAROBIOUS CRUSTACEUS (Fuckel) Rehm, Ber. Naturh. Ver.
Augsburg 26: 17. 1881

Cultivated on rabbit dung from Geneva Creek Canyon.

RYPAROBIOUS PACHYASCUS Zukal; Rehm, Hedwigia 27: 167. 1888
Cultivated on horse dung from Tolland.

RYPAROBIOUS SEXDECIMSPORUS (Crouan) Sacc. Syll. Fung. 8: 541.
1889

Cultivated on cow dung from Geneva Creek Canyon.

SACCOBOLUS KERVENI (Crouan) Boud. Ann. Sci. Nat. V. 10:
229. 1869

On cow dung from Geneva Creek Canyon.

SACCOBOLUS NEGLECTUS Boud. Ann. Sci. Nat. V. 10: 231. 1869
Cultivated on horse dung from Geneva Creek Canyon.

HELOTIACEAE

CHLOROSPENIUM AERUGINOSUM (Oeder) De Not. Comm. Critt.
Ital. 1: 376. 1864

Only the stained wood of this species was collected by Professor Bethel, at Tolland, so that the identity of the species is uncertain.

HELOTIUM CITRINUM (Hedw.) Fries, Summa Veg. Scand. 355.
1849

Common on rotten wood, Tolland and Geneva Creek Canyon.

?HELOTIUM POPULINUM Fuckel, Symb. Myc. 316. 1869

The plants referred to this name are very minute and bright lemon-yellow, at least in fresh specimens, and occur in abundance on decaying leaves of *Populus tremuloides*. Fuckel's species is described as subfuscous and we are therefore in doubt as to the identity of our plants.

HELOTIUM SULPHURATUM (Schum.) Phill. Brit. Discom. 161.
1887

Common in Geneva Creek Canyon on dead spruce branches partially buried in the ground. Similar to *Helotium citrinum*.

DASYSCYPHA ARIDA (Phill.) Sacc. Syll. Fung. 8: 455. 1889
Peziza arida Phill. Grevillea 5: 117. 1877.

Lachnum Engelmanni Earle, Pl. Baker. 1: 25. 1901.

Dasyscypha fuscousanguinea Rehm, Ascom. 112; Ber. Naturf. Ver. Augsburg 26: 30. 1881.

This species was originally described from material collected in Blue Canyon, Sierra Nevada Mountains, California, by Harkness and Moor. The type has not been seen but a specimen in the herbarium of the New York Botanical Garden collected by Dr. Harkness in Blue Canyon, California, has been examined and our Colorado specimens conform well with this. Dr. Rehm (l. c.) states that this species is a variety of *Dasyscypha fuscousanguinea* Rehm. So far as we can see they are identical but inasmuch as Dr. Rehm's specimens were distributed without a description we cannot do otherwise than accept the name published by Phillips. Numerous specimens were collected at Tolland and in the Geneva Creek Canyon and at first referred to *Lachnum Engelmanni* Earle, which species was later found to be identical with that of Phillips.

The species appears to be common and widely distributed, specimens having been examined from California, Colorado, Montana, Oregon, Washington, and Newfoundland, occurring on dead branches of pines and spruces.

***Dasyscypha chlorella* nom. nov.**

Lachnum viridulum Massee & Morgan; Morgan, Jour. Myc. 8: 187. 1902. ?Not *Dasyscypha viridula* (Schr.) Sacc. Syll. Fung. 8: 437. 1889.

The type of *L. viridulum* has not been seen, but our specimens conform well with a colored drawing made from the type by Massee, as well as with the original description. A specimen collected at Tolland seems to conform with the one collected in Geneva Creek Canyon except that the plants have faded to nearly white.

LACHNELLA CORTICALIS (Pers.) Fries, Summa Veg. Scand. 365. 1849

Common on bark, more rarely on decorticated wood at Golden and in the Geneva Creek Canyon. The species is very variable, the spores being clavate or fusiform, often as long as 26μ and with 1-3 delicate septa. *Lachnella canescens* Cook; Phill. Brit. Discom. 259 appears to be identical.

LACHNELLA FLAMMEA (Albert. & Schw.) Fries, Summa Veg. Scand. 365. 1849

Peziza flammea Albert. & Schw. Consp. Fung. 319. 1805.

Dasyscypha allantospora Earle, Pl. Baker. 2: 5. 1901.

Lachnella rhoïna Earle, Pl. Baker. 2: 6. 1901.

Very common on dead twigs of various kinds at Tolland and in the Geneva Creek Canyon. The types of *Dasyscypha allantospora* and *Lachnella rhoïna* have been examined and found to be rather faded specimens of the above. The spore measurements of the latter species given by Professor Earle are too small.

LACHNELLA RESINARIUS (Cooke & Phill.) Phill. Brit. Discom. 242. 1887

Specimens collected at Tolland conform fairly well with the original description of this species. The plants occur on the bark of some conifer and somewhat resemble *Lachnellula chrys-*

ophthalma, but are smaller, a little less hairy, and the spores are very different, being ellipsoid or allantoid, while in the latter species they are globose.

LACHNELLULA CHRYSOPHTHALMA (Pers.) Karst. Medd. Soc. Faun. Fl. Fenn. 11: 138. 1884

This is one of the most common species of cup-fungi on conifers in the canyons of the mountains, both at Tolland and at Geneva Creek, and being rather large and bright-colored, is easily detected. Our plants compare very favorably with European exsiccati and although common in the Rocky Mountains, no American specimens could be found in our collections at the New York Botanical Garden.

MOLLISACEAE

MOLLISIA CINEREA (Batsch) Karst. Myc. Fenn. 1: 189. 1871
One collection on old wood near Tolland.

ORBILIA VINOSA (Albert. & Schw.) Karst. Myc. Fenn. 1: 101. 1871

On old wood in Geneva Creek Canyon.

ORBILIA FLEXUOSA Grossl. Grevillea 22: 44. 1893

On old wood in Geneva Creek Canyon.

PSEUDopeziza MEDICAGINIS (Lib.) Sacc. Malpighia 1: 455. 1886
Abundant on leaves of alfalfa at Golden.

PATELLARIACEAE

PATELLARIA ATRATA (Hedw.) Fries, Syst. Orb. Veg. 113. 1825
On old wood in Geneva Creek Canyon.

CENANGIACEAE

CENANGIUM POPULNEUM (Pers.) Rehm in Rabenh. Krypt. Fl. 1: 220. 1896

Common on *Populus tremuloides* in Geneva Creek Canyon.

Godronia Betheli sp. nov.

Ascomata erumpent through the outer bark of the host, single or occurring in clusters, often so numerous as to form congested masses many cm. in diameter and almost entirely surrounding the branches on which they grow; individual ascomata at first nearly

globose, opening at the top so as to leave an irregular margin, at maturity about 1 mm. broad and the same in height, brownish and furfuraceous externally, hymenium freely exposed at maturity, whitish or bluish-white; asci clavate, $130 \times 7-8 \mu$, 8-spored; spores in a fascicle in the ascus, subfiliform, tapering toward either end, sharp-pointed, $65-85 \mu$ long and $3-4 \mu$ thick at the broadest point, becoming 7-septate at maturity and often slightly constricted at the septa, hyaline; paraphyses abundant, filiform.

On the branches of some species of willow, Tolland, August, 1910.

STICTIDACEAE

CRYPTODISCUS ATRO-CYANEUS (Fries) Sacc. Syll. Fung. 8: 670.
1889

Very common on old wood of *Populus tremuloides*, Geneva Creek Canyon, Golden and Tolland.

Ocellaria ocellata (Pers.)

Peziza ocellata Pers. Syn. Fung. 667. 1801.

Ocellaria aurea Tul. Fung. Carp. 3: 129. 1865.

Dermatea inclusa Peck, Ann. Rep. N. Y. State Mus. 30: 62. 1878.

Dermatea macrospora Clements, Bull. Torrey Club 30: 87. 1903.

The plants are erumpent but do not rise much above the surface of the bark. Very common on willow about Tolland. Fungi Columbiani 1918, issued as *Dermatea inclusa* Peck, is identical with our Colorado specimens and so far as we can judge from the description Dr. Peck's species is identical with the above.

PROPOLIS FAGINEA (Schrad.) Karst. Myc. Fenn. 1: 244.
1871

Propolis versicolor Fries, Summa Veg. Scand. 372. 1849.

On old wood, Tolland.

STICTIS RADIATA (L.) Pers. Obs. Myc. 2: 73. 1799

On old wood, Geneva Creek Canyon and Tolland.

HYPODERMATACEAE

HYPODERMA LINEARE (Peck) Peck; Thüm. Myc. Univ. 1073.
1878

Rhytisma lineare Peck, Ann. Rep. N. Y. State Mus. 25: 100.
1873

Abundant on leaves of *Pinus* sp. in the vicinity of Tolland.

This species is characterized by its peculiar spores which appear like two spores united by a very narrow neck.

LOPHODERMIVM ARVNDINACEVM (Schrad.) Chev. Fl. Par.

I: 435. 1826

One specimen collected at Tolland on the stems of some grass.

HYSTERIACEAE

HYSTERIVM COMPRESSVM Ellis & Ev. Jour. Myc. 8: 69. 1902

On old wood in Geneva Creek Canyon.

HYSTEROGRAPHIVM MORI (Schw.) Rehm, Ber. Nat. Ver.

Augsburg 26: 90. 1881

Collected on old wood at Berkeley by Professor E. Bethel.

HYSTEROGRAPHIVM VVLVATVM (Schw.) Rehm, Ascom. 315.

On old wood at Golden and Tolland.

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